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ABSTRACT

The second of three planned reports on 4-year outcomes for the 2,643 first-time students who entered Prince George's Community College (PGCC) in fall 1990, this document describes outcomes related to patterns of attendance and length of enrollment for various forms of academic achievement. Results of the analysis included the following: (1) between fall 1990 and spring 1991, 39% of the cohort failed to return, with another 17% failing to return by the next fall semester; (2) attrition, however, was found to be disproportionately high in the first two semesters, dropping off significantly in subsequent semesters; (3) of the 56% who attended more than 2 major terms, 34% enrolled consecutively, 15% stopped out occasionally, and 7% experienced major enrollment interruptions in the 4-year period; (4) 28% of all degree-seekers were classified as achievers after 8 major terms of study; (5) 96% of students with high persistence, good standing, sequential attendance, full-time study load, and not requiring remediation ended up as achievers; (6) on average, the cohort students spent 3.4 terms at PGCC; (7) it took sophomores a mean of 3.9 major terms to accumulate 30 credit hours; (8) students who graduated with associate degrees during the period enrolled in an average of 5.9 major terms; (9) full-time sophomores and non-developmental sophomores took one less term to collect 30 credit hours than part-timers; and (10) the time taken to transfer did not appear to be affected by study load and developmental placement. (KP)

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Tracking Student Progress at PGCC:
Fall 1990 Entering Cohort
Four-year Patterns of Attendance
and Timing of Outcomes

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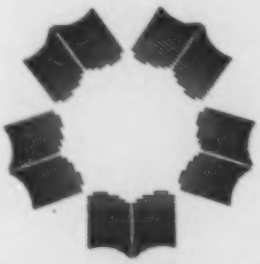

PRINCE GEORGE'S
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Enrollment Analysis EA96-1

July 1995

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PRINCE GEORGE'S COMMUNITY COLLEGE
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TRACKING STUDENT PROGRESS AT P.G.C.C.: FALL 1990 ENTERING COHORT FOUR-YEAR PATTERNS OF ATTENDANCE AND TIMING OF OUTCOMES

Enrollment Analysis EA96-1
July 1995

Introduction

Since the Fall of 1990 the Office of Institutional Research and Analysis has been tracking a cohort of first time freshmen (N = 2,643) and is now in a position to report on its progress after four years of study. We have already released the first of three studies in the form of a basic analysis of cohort final academic outcomes based upon a new paradigm of student achievement.[1] In this second report, we will be focusing on the process leading to final outcomes, especially on patterns of student attendance and the timing of various forms of academic achievement. (The final report will attempt to provide a comprehensive analysis of the correlates of achievement, systematically linking social background and academic process variables like attendance patterns with final outcomes.)

The Cohort 1990 data set is drawn from PGCC student record databases, augmented with material supplied by the Maryland Higher Education Commission's Transfer Student System to enable us to identify cohort members who ceased community college attendance due to transfer to a Maryland four-year public post-secondary institution. Attendance, study progress and related data are all organized on a term-by-term basis so that we may assess student academic status and level of achievement at any point in the four year process, connect patterns of attendance with outcomes, and summarize any part of the process in terms of time to outcome. Length of time to outcome will usually be reported in terms of raw or mean number of major semesters -- fall and spring -- with a maximum duration of eight (Fall 1990 to Spring 1994). Outcomes occurring over any of the two minor summer terms will be back-dated as if they took place during the previous spring semester.

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[1] See *Tracking Student Progress at P.G.C.C.: Basic Findings of the 1990 Entering Cohort Academic Outcomes Analysis* (Enrollment Analysis EA95-7, June 1995).

The academic outcomes paradigm used in this study was developed by OIRA to provide a practical means of assessing overall student achievement given the sort of student record data routinely collected at PGCC and other Maryland community colleges and the rather limited transfer tracking data available from state sources.[2] Our first Cohort 1990 report thoroughly reviewed the outcome paradigm's category definitions and how cohort members were distributed. The table below gives a brief recapitulation for reference purposes. The first column displays the breakdown of all cohort members (N = 2,643) by academic outcome at the end of four years (including the results of the final two summer terms), while the second column shows outcome percentages when cohort members were restricted only to those with degree-seeking objectives (N = 2,387):

Table 1. Cohort 1990 Four-Year Outcomes

Outcome Category	% Whole Cohort	% Degree-Seekers
Award Only (Associate Degree/Certificate/Letter-of-Recognition)	3	4
Award and Transfer	2	2
Transfer Only (MHEC-TSS Data)	9	10
All Awards	*6*	*6*
All Transfers	*11*	*12*
Exiters w/o Award or Transfer/Sophomore in Good Standing Status	6	7
Still Attending/Sophomore in Good Standing	5	6
Still Attending/Not a Sophomore in Good Standing	6	7
Exiters w/o Award, Transfer or Soph. in Good Standing Status	59	65
with GPA of at least 2.0	*23*	*26*
with GPA of under 2.0	*35*	*39*
Special Motive (Current Job or Enrichment Goal/< 2 Term Enrollmt)	10	--
All with Sophomore Status (30+ Cum. Credit Hours) by Last Term	*25*	*28*
All with G.P.A. of 2.0 or Better by Last Term	*57*	*57*
TOTAL PERCENT	100	100
TOTAL NUMBER	2,643	2,387

[2] To be included for tracking by the TSS, a student must have transferred at least 12 credits to a Maryland public college or university; students transferring fewer credits, or who transferred to Maryland four-year private, out-of-state or any two-year schools or training programs are invisible to the system. See EA95-7, *op. cit.*, on the repercussions of these limitations.

Enrollment Retention and Attrition

The most basic question answerable through student cohort analysis is how well its members were "retained" by the college or university over a set of study semesters. Since student enrollments are tracked on a term-by-term basis, an exact retention (or from the loss point of view, attrition) curve can be plotted for the whole life of the cohort, allowing analysts to compare same-group drop rates for early and later terms, all fall-to-springs, all fall-to-falls, etc. This is far superior to the traditional non-cohort "snapshot" approach which, for example, captures the one-time fall-to-spring retention rate for all students enrolled in the previous fall term regardless of each student's entry term. In this case, not only is the retention assessment limited to an isolated pair of semesters, but the rate calculated aggregates the results of the enrollment behaviors of green freshmen, still struggling to get the hang of college, with committed veteran students nearing transfer or graduation, and all varieties in between, making a clean interpretation impossible.

Table 2. Cohort 1990 Four-Year Major Term Patterns of Enrollment

Retention Type	T1 Fall 90	T2 Spring 91	T3 Fall 91	T4 Spring 92	T5 Fall 92	T6 Spring 93	T7 Fall 93	T8 Spring 94
Whole Cohort								
Attending	100	61	45	37	28	23	18	13
% Drop	--	39	17	8	9	5	5	5
Cum. % Drop	--	39	56	63	73	78	83	87
Continuing	100	72	56	48	37	31	22	15
% Drop	--	28	16	8	11	6	9	7
Cum. % Drop	--	28	44	52	63	69	79	86
Degree-Seekers								
Attending	100	65	49	41	31	25	19	14
% Drop	--	35	16	9	10	6	6	5
Cum. % Drop	--	35	51	59	70	75	81	86
Continuing	100	77	62	53	41	34	24	16
% Drop	--	23	15	9	13	7	10	8
Cum. % Drop	--	23	38	47	59	66	76	84

NOTE: Whole Cohort N = 2,643, Degree-Seekers N = 2,387

Figure 1. Four-Year Enrollment Trend

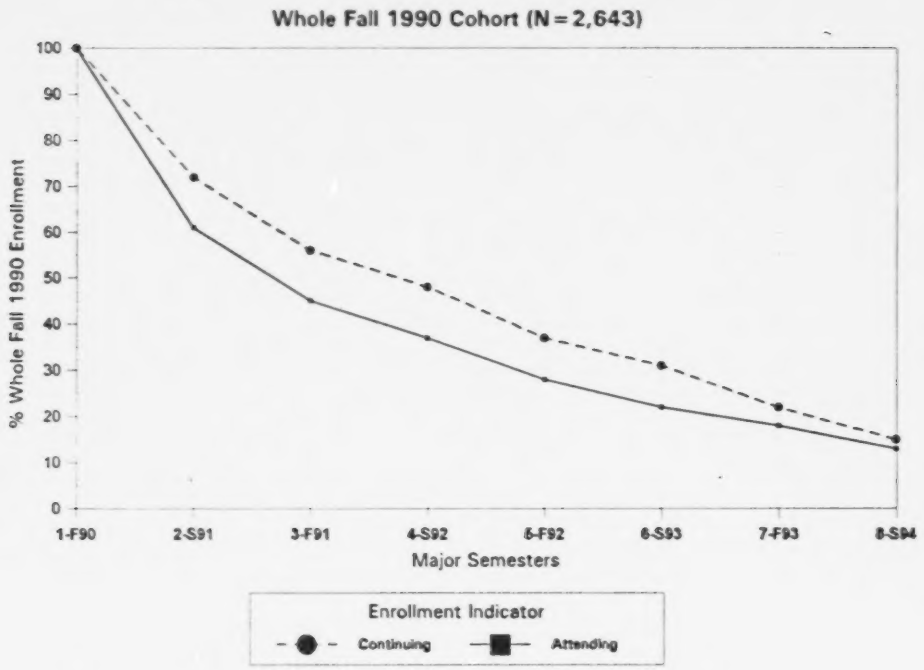

Figure 2. Four-Year Enrollment Trend

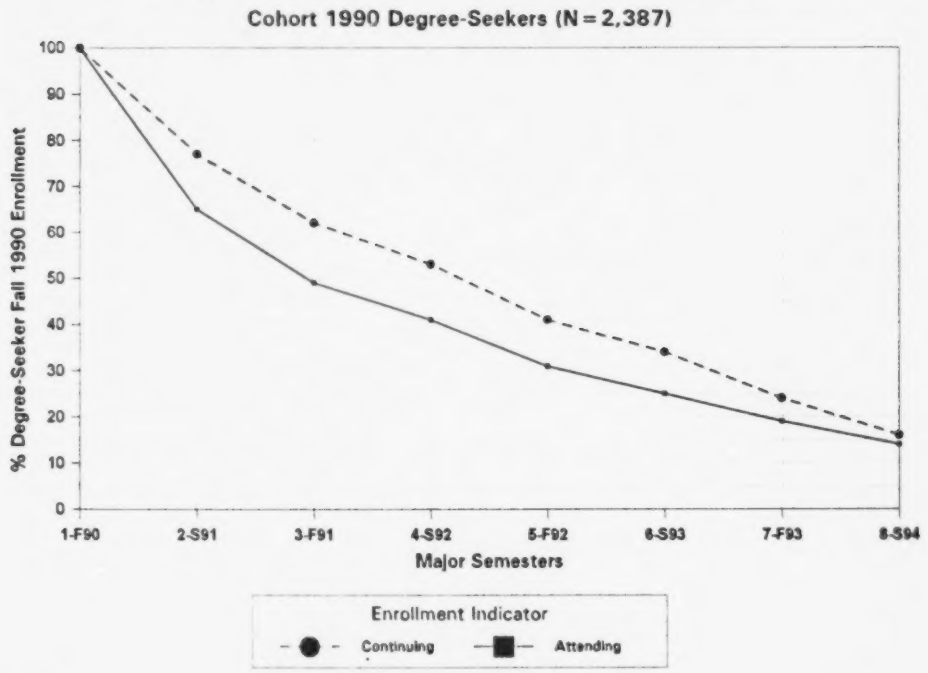

Table 2, above, shows how Cohort 1990 retention/attrition varied across the eight major semesters covered by this study. The data in the top half of the table provide retention/attrition rates and associated statistics for the entire cohort (percent of total Fall 1990 registration, N = 2,643) while the bottom half gives the parallel data for the main degree-seeking component of the cohort (percent of Fall 1990 registration excluding *special motive* students, N = 2,387).

Retention percentages are calculated twice, in each sample case. *Percent Attending* indicates the proportion of students enrolled in the original semester who were actually registered in a particular later semester. This standard approach to measuring retention does not, however, take into account the effects of the *stopping out* phenomenon (students electing to skip or "stop out of" one or more terms only to return later) which is so prevalent in the enrollment behavior of community college student bodies. To gauge community college retention more realistically, OIRA has developed a *Percent Continuing* measure. This counts a student as "retained" during Term X if the student actually attended Term X *or* can be shown to have been enrolled *in any semester subsequent to Term X*.[3]

The shaded rows of Table 2 present the four basic retention curves for Cohort 1990 (whole cohort or degree-seeker sample by percent attending or percent continuing). These are also depicted graphically in Figures 1 and 2 which follow the table. Lastly, each retention series is accompanied by supplementary statistics which show inter-term percent drop-off (% T_n - % T_{n+1}) and term-by-term cumulative percent attrition (the mirror image of term-by-term percent retention[4]).

The salient finding of Table 2 is how difficult the first two semesters seem to be for PGCC entering freshmen. All four retention curves agree in depicting a radical drop in retention for Terms 1 and 2, thereupon the third semester, also showing heavy though not immoderate attrition, acted as a sort of turning point, enrollment drop-off trickling off to 5-10 percent for each of the remaining terms 4-8, until by the end of Term 8, only around one student in seven still remained in the academic pipeline.[5]

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[3] For example, enrollment data may show Sally attending the Fall 1990 term, "stopping out" of the Spring 1991 semester but returning to register in the Fall of 1991. Sally would *not* be classified as a Spring 1991 *attending* student, but she would qualify as a Spring 1991 *continuing* student since the Spring 1991 semester was *not her final term* at PGCC.

[4] % Retention + Cumulative % Attrition may not sum exactly to 100 due to rounding.

[5] Experience with previous entering freshmen cohorts suggests that by the end of the sixth year, the cohort effectively terminates with a continuing student percentage falling to a negligible 2-4.

The most dramatic initial attrition occurred in the Whole Cohort/Percent Attending series. These data appear to show Cohort 1990 losing almost two-fifths of its original members (39 percent) between Fall 1990 and Spring 1991, and nearly another fifth (17 percent) not returning for the second fall term -- 56 percent in all gone before Term 3 even began. The Whole Cohort/Percent Continuing series, however, presents a somewhat less precipitous enrollment drop during the Cohort's first year -- 44 percent off -- illustrating the importance of taking into account the presence of term skippers in the student body (12 percent of Cohort 1990's members "stopped out" of the Spring 1991 term but re-enrolled sometime thereafter). Also, we might wish to exclude from our retention calculation *special motive students* (10 percent of the whole cohort and 22 percent of all cohort members who exited before the third term) and focus only on those with genuine academic aims. The Degree-Seeker/Percent Continuing series shown on Table 2, which both adjusts for stopping out behavior and discounts students without academic program objectives, sets the first year Cohort 1990 attrition rate at 38 percent -- 18 percent lower than that derived from standard Whole Cohort/Percent Attending methodology.

The main point, however, is that even the most moderating retention curve we can draw from the Cohort 1990 data shows enrollment attrition occurring disproportionately in the two introductory semesters -- two in five degree-seekers disappeared from the Cohort before Term 3.

Interpreting Retention/Attrition

Every year the U.S. Department of Education requires the college to submit a retention report, based on the "snapshot" approach (percent attrition for the all previous fall term credit-course taking students given the following spring term registration), as a condition of continued federal student aid funding. The DED then uses the standard of below 33 percent inter-term enrollment drop to determine whether a college's or university's rate of enrollment attrition is acceptable; should an institution's rate exceed this figure, its federal aid funding is put in jeopardy. In recent years, PGCC has only just managed to produce a rate under the .33 cut-off point.

Setting aside the already discussed methodological flaws inherent in the snapshot approach to measuring retention/attrition and the arbitrariness of the one-third attrition standard used for funding assessment, the DED's practice here well illustrates a deeper problem in using retention/attrition statistics for assessment purposes -- the ill-considered but commonly accepted, fundamental assumption that a high or increasing rate of attrition always means that a higher educational institution is not adequately doing its job -- that the college or university is providing

inadequate instruction and student support. However, it only takes a moment of serious reflection on the realities of the college-level learning process to come to a fairer, more complex understanding.

Some loss of enrollment is "natural", the consequence of forces beyond institutional control. Inevitably, some students will encounter misfortune in the form of health, family, job or financial problems preventing continued study. Because community college enrollment is open, some attrition will reflect the sheer statistical fact that students always vary in academic ability and level of college preparedness, and many of those on the far negative side of the distribution curve will find college study beyond them in the normal course of events. This latter cause of attrition might even be demographically conditioned. If the demographic trends in a community college's service area produce ever increasing numbers of young people poorly prepared for post-secondary study, than the institution can expect -- all things being equal -- a parallel decrease in enrollment retention. Furthermore, both these "natural" causes of enrollment attrition might be expected to concentrate their effects during a particular period in the study cycle -- the initial terms, when students are maximally challenged by the attempt to adjust to the new, demanding college environment.

A degree of enrollment attrition may also prove to be more apparent than real -- a statistical illusion resulting from conceptual carelessness or problems of operationalizing indicators. The concept of retention ought to relate only to degree-seeking students, for example, who intend long-term enrollment with an academic reward or transfer at its conclusion. But it will always be the case in an open enrollment environment that a not insignificant proportion of students will have registered simply to take a few courses of personal interest to them with no long-term academic objective in mind. Enrollment attrition in this group is in a sense neutral and should not be counted as a retention failure of the institution since these students never intended to be "retained" for programmatic study. Even more serious is the failure (often the inability) of retention assessors to take into account what might be called *positive attrition* -- the cessation of attendance that results from student achievement of their objectives: graduating with a degree or other award or transferring to a four-year school. Unless "successful exiters" are removed from consideration when attrition level is calculated, the estimate will be badly compromised as an indicator of system performance, producing inflated dropout rates. Unfortunately, even when assessors attempt to exclude achievers, this is not always possible methodologically -- in particular, the data-gathering limitations of student tracking systems often make identifying transfer students highly problematical.

With all of this in mind, what can we say that the retention data in Table 1 teaches us? In particular, is the fact that Cohort 1990 enrollment attrition occurred so disproportionately in the first two semesters a sign of institutional malfunction? And, were the Fall 1990/Spring 1991 losses of 44 percent (Whole Cohort/Percent Continuing method) or 38 percent (Degree-Seekers/Percent Continuing method) high, medium or low, and by what standard?

The answer to the first question would seem to be: No. Almost every other community college using cohort analysis reports a similar pronounced student tendency to break off attendance in the early terms. Universally, Year One in an entering cohort's existence appears to act as a sort of natural "shakedown" period during which deliberate short-termers complete their personal study agenda, less committed students re-assess whether college is for them, the more poorly prepared academically become discouraged, and in general the pressures resulting from having to adjust one's family life, job situation and personal habits to make room for college study are greatest.

The answer to the rate question depends upon the addendum "high or low *compared to what*?" Compared to first two term enrollment drops known for other community colleges, PGCC's percent decline is higher than some, lower than others and on the whole not unusual. Along side PGCC's own past early term attrition figures? -- the answer hangs on a single comparison point but this suggests that early term enrollment here may be relatively stable. A retention analysis of the 1984 first time entering cohort yielded a combined Term 1/Term 2 enrollment drop very close to the parallel Cohort 1990 rate (47 percent by the Whole Cohort/Percent Continuing method). It is even possible that we have been more than holding our own over time, since the 1990 cohort attrition figure was actually 3 points lower, while during the intervening six years the percentage of fall entering students placing into at least one developmental program grew from around 54 percent to 60 percent.

In the end, however, it may be that we should be asking strategic rather than assessment questions -- what to do rather than who is at fault. From a policy-making standpoint the only real question raised by troubling retention data is what they can teach us about how the college might realize the maximum continuing student attendance at PGCC with the minimum of resources spent. Clearly, according to the data, attendance "at-riskness" is greatest during the initial fall and spring terms. Therefore, the college might best optimize retention levels generally by strategically focusing developmental education and tutorial efforts on first year students.

Enrollment Behavior and Academic Outcomes

Thus far, we have been looking at our cohort analysis findings on retention/attrition in isolation. Retaining students, however, is not an institutional end in itself but merely an essential step in moving students toward accomplishing their educational objectives. It is an elementary proposition that students who don't stick to their studies, can't earn degrees and transfers, but those who *persist* in attending college and who continue to enroll in and pass credit courses will eventually complete their programs. From this angle, the main question is how a student's attendance choices contribute to or detract from the likelihood of academic success.

In this section, we will discuss how Cohort 1990 persistence and other attendance phenomena (stopping-out and study load choices) impact on academic achievement. We will also discuss how two "academic status" variables (remedial program placement and academic performance) affected cohort educational outcomes. Finally, we will explore how attendance and status variables interacted to condition cohort student progress. In this way, we hope to begin to get a sense of how attendance and status phenomena are more than just a miscellany of disparate forces but work together to form a complex educational process at PGCC.

Persistence and Other Attendance Phenomena. Table 3, below, presents the data on the relationship between various kinds of attendance behavior and study outcomes. The first three numerical columns recount the achievement indicator rates (Percent Achievers, and its two components -- Percent Award/Transfer Earners and Percent Other Sophomores in Good Standing) sustained by each of the cohort student categories (table rows) signified in the leftmost column headed "Attendance Type." The figures are percentages calculated against the total number of students found in the category (shown in the far right column). The column headed Percent Type provides the percentage of all degree-seekers (N = 2,387) represented by each student category. The table gives each Attendance Type indicator twice -- first in its full form and second, as a summary dichotomous variable.

In the table, *attendance persistence* is measured in terms of total number of major terms attended, a simple, straight-forward method which controls for stop-out behavior. The results are remarkable: attendance persistence proved to be the single most powerful predictor of Cohort 1990 student success. Only a handful of cohort degree-seekers attending just 1-2 terms classified as Achievers (4 percent -- all early transfers), but the Achiever percentage steadily mounts as we move up indicator categories until we reach those who attended at least seven semesters and find over seven in ten (72 percent) managed to earn an award, transfer or sophomore in good standing status. Clearly, the truism holds: the more terms attended, the higher the likelihood of academic success.

Table 3. Percent Achievers by Major Term Attendance Behavior

Attendance Type	% Achiever	% Award/ Transfer	% Other Soph/GS*	% Type	N Type
All Degree-Seekers	*28*	*16*	*13*	*100*	*2,387*
Attendance Persistence Pattern					
Attended 7-8 Major Terms	72	22	50	12	276
5-6 Terms	55	33	22	18	440
3-4 Terms	31	20	10	26	623
1-2 Terms	4	4	<.5	44	1,048
Attended 4 or More Major Terms	57	29	28	44	1,053
Attended <4 Major Terms	6	5	1	56	1,334
Attendance Sequence Pattern					
Term 3+/Consecutive Only	58	31	27	34	809
Term 3+/Minor Interruption	38	18	20	15	367
Term 3+/Major or Multiple Gaps	15	7	8	7	163
1-2 Term Attendance Only	4	4	<.5	44	1,048
Consecutive Attendance Only	58	31	27	34	809
Other Attendance Pattern	13	8	6	66	1,578
*Launch Period Attendance Pattern***					
"Good Start" (At Least T1+T2+T3)	55	29	25	43	1,030
All Other Term 3+ Attendance	23	10	13	13	309
Year 1 Attendance Only	4	4	<.5	38	909
"Good Start" Only	55	29	25	43	1,030
Other Attendance Pattern	8	5	3	51	1,218
Mean Term Study Load Pattern					
15+ Credit Hours	59	52	7	4	104
12 - 14 Credit Hours	43	28	15	28	669
9 - 11 Credit Hours	37	17	20	23	558
6 - 8 Credit Hours	19	6	13	23	669
< 6 Credit Hours	4	1	3	21	512
Mean Term Credit Load 12+	45	31	14	32	773
Mean Term Credit Load <12	20	8	12	68	1,614

NOTE: Award/Transfer and Sophomore in Good Standing percents may not exactly sum to reported Achiever percent due to rounding * Sophomores in Good Standing ** Non-consecutive 2-term students dropped from calculations (n=139)

Table 3 also contains an interesting secondary finding relating to persistence and type of achievement. The cohort degree-seeker award/transfer achievement rate actually peaked among 5-6 semester attenders (33 percent), dropping somewhat (to 22 percent) among 7-8 term persisters. Within the latter, sophomore status in good standing without award or transfer was the predominant achievement sub-category (50 percent). This might suggest that prolonged persistence occurs mainly among dedicated students who have closure problems due to delays caused by academic or personal difficulties.

Another vital contributor to the likelihood of student success, according to Table 3, was *attendance continuity* -- the degree to which a student avoids skipping terms ("stopping out") and enrolls sequentially. Table 3 shows our attempt to condense a tremendous range of highly variable student enrollment behavior in a single indicator with just four comprehensive categories[6] -- consecutive attendance only, some minor attendance interruption, major attendance interruption, and too few terms for attendance continuity calculation.[7] Using this scheme, we found that cohort consecutive attenders proved half again as likely as students with minor interruption enrollment histories to make the Achiever cut (58 to 38 percent, respectively) and almost four times more likely than chronic stoppers-out (15 percent) to classify as achievers. Apparently, attendance continuity is highly promotive of academic progress, independent of attendance persistence, suggesting the importance of a sustained educational effort for developing and maintaining study skills and for leveraging past learning into future good course performance.

The third attendance indicator presented on Table 3 is a special application of the ideas of attendance persistence and continuity to a particular time interval. Given our earlier finding on how difficult surviving their first few terms was for cohort degree-seekers, we decided to single out attendance behavior during this critical "launch period" as a potential explanator of academic outcomes. The Launch Period indicator has three categories based on our speculation that sustained enrollment through all three terms during this most academically dangerous of times might

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[6] Presenting community college attendance continuity data in a manageable format is difficult because aggregate student enrollment behavior is so complex; for example, given all the enrollment and stop-out possibilities, Cohort 1990 degree-seekers generated 112 different and distinct patterns of attendance for the eight major terms studied.

[7] Consecutive attenders were students who attended without a break at least three semesters (the minimum number for the concept of consecutive enrollment to be meaningful). Minor interruption students were 3 term-plus enrollees who skipped no more than a third of terms within their attendance span (the number of terms between the first and last semesters attended) and had no consecutive "stopped-out" terms. Major interruption students were 3 term-plus enrollees with consecutive missed terms or who skipped more than a third of the terms while attending PGCC. The final residual category consisted of those enrolled in fewer than three terms.

produce a sort of "good start" effect. We hypothesized that students *off to a good start* might be better set up to pursue their studies to their right conclusions than those who kept pace in enrollment but who went through a less stable inaugural period. The first Launch Period category represents all the "Good Start" cohort degree-seekers (3 term-plus attenders who enrolled in all three initial terms -- Fall 1990, Spring 1991 and Fall 1991); the second includes 3 term-plus attenders who skipped either Spring 1991 or Fall 1991 or both ("Shaky Starters"). The third category consists of those who did not survive the Launch Period -- short-term students who ceased attending altogether before Fall 1991, the third term ("No-Goers"). As Table 3 documents, our hunches were amply rewarded. "Good Start" students in the cohort collectively out-achieved "Shaky Starters" by more than two to one (55 to 23 percent, respectively).[8] "No-Goers," as expected, experienced almost no academic progress; just 4 percent classified as achievers.[9]

The final attendance indicator we tested for impact on academic success was mean term credit equivalent course hours attempted. Study load is an enrollment variable because it gets at the idea of *concentratedness of attendance*. While persistence and continuity variables are based on the one-or-the-other semester presence or absence of a student, study load measures the *degree* to which a student is present in course hour units. The number of course hours attempted each term directly affects the pace of credit accumulation. All things equal, full-time students will move more quickly toward graduation and transfer than part-timers, thus avoiding the many pitfalls of prolonged attendance, and also stand to benefit from immersion in their studies.[10] Table 3 indicates that cohort degree-seekers averaging the equivalent of a full-time study load each term were more than twice as likely as part-timers to classify as achievers after four year from first enrollment (45 to 20 percent, respectively). *Super*-full-time equivalent students (averaging 15+ course hours per term) generated an achievement rate of 59 percent, and 52 percent were award/transfer earners, illustrating the greater tendency of high load students to achieve in the traditional academic sense; lower load achievers were more often of the sophomore in good standing variety.

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[8] As one might guess from the fact that Table 3 shows "Shaky Starters" -- by definition, students with interrupted enrollment histories -- numbering only 309 students compared with 1,030 "Good Start" students, the "Good Start" effect was highly correlated with attendance persistence (eta = .80). To guard against the possibility that the effect was not simply just the attendance persistence effect in another guise, we cross-tabulated the Launch Period indicator with the Achievement indicator, controlling for number of terms attended. We found that for all terms enrolled sub-samples save one, "Good Starters" continued to out-achieve "Shaky Starters" by at least two to one.

[9] Excludes the 139 *2-term* students whose second enrollment occurred during Fall 1991 or afterwards; these *less than three term* "Shaky Starters," not shown in the table, collectively turned in a zero percent Achievement rate.

[10] Based on *official credit hours attempted*, which includes remedial course enrollments.

Academic Attribute Effects. In the previous section we saw how a student's *choices* among various attendance options could improve or harm the odds of academic success. In this section we will explore the role of student academic *attributes*, focusing on the consequences of levels of college preparedness and course performance. Table 4, below, which shares Table 3's format, provides the data for discussion.

Table 4. Percent Achievers by Selected Academic Status Groups

Academic Status Type	% Achiever	% Award/ Transfer	% Other Soph/GS	% Type	N Type
All Degree-Seekers	*28*	*16*	*13*	*100*	*2,387*
*Term 1 Developmental Placement**					
Tested/No Remediation Required	44	28	16	40	949
Required in 1 Area	28	12	16	19	451
Required in 2 Areas	17	8	9	17	398
Required in 3 Areas	11	3	8	17	400
No Placement Testing	10	4	6	8	189
Non-Developmental Students	39	24	15	48	1,138
Developmental Students	19	8	11	52	1,249
Academic Standing Term Pattern					
Always in Good Standing	58	35	24	36	849
GS for 50-88 % Terms Attended	27	12	15	27	650
GS for 13-38 % Terms Attended	2	0	2	5	113
Never in Good Standing	<.5	<.5	0	33	775
Always in Good Standing	58	35	24	36	849
At Least 1 Term Not Good Standing	12	5	7	64	1,538

NOTE: Award/Transfer and Sophomore in Good Standing percents may not exactly sum to reported Achiever percent due to rounding * Any testing criterion; students did not necessarily take all 3 examinations

For the purposes of this study, level of college preparedness is reflected in the developmental education placement process. Prior to enrollment, most students take a battery of basic college skills examinations which place them into (or our of) one or more remedial programs. Besides intrinsically indicating a lack of academic readiness to handle college course material, developmental placement tends to have real if indirect influence on credit accumulation. Remedial course-taking usually delays

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the onset of, and otherwise interferes with, credit course-taking. Sure enough, Table 4 shows the cohort's non-developmental[11] degree-seekers out-achieving its developmental members by two-to-one after four years (39 to 19 percent, respectively). Within the developmental sub-sample, students needing remediation in only one area were almost twice as likely to finish their PGCC careers as achievers than 2-Area students (28 to 17 percent, respectively) and nearly three times as likely to achieve than 3-Area students (11 percent).

The second variable covered in Table 4 was academic standing, basically a matter of quality of grade point average, on the notion that course-passing logically is second only to course-taking in accumulating credits. Cohort students never out of *good standing,*[12] according to the table, proved to be five times as likely to finish attending PGCC as achievers than those not qualifying as registrants in good standing during at least one term attended (58 to 12 percent, respectively).

Variable Interactions and the Academic Process.

We have just seen how several important types of student attendance choices and academic attributes powerfully condition academic success probabilities. Thus far, however, we have been examining variable success impacts individually. Obviously, in the real world, the set of factors facilitating or inhibiting academic progress work in concert. Their effects are cumulative, interactive.

Students who come to PGCC are complex beings, like all humans, each a mix of many *personal attitudes, background characteristics and native capabilities*. Furthermore, they enter a complex *educational structure*, with a great number of interlocking components, and embark upon a concomitantly complex *academic process*, with a multiplicity of paths, branch-points and filters. All of the above interweave to form the *total PGCC system*, with *college-level learning* its intended product (mostly as attested though the earning of degrees and further educational opportunities); and this total system will be the focus of our third report on the correlates of academic progress.

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[11] *Developmental* students were those placing into *any* of the three remedial program areas in their initial term, whether or not all three placement tests were actually taken; *non-developmental* students were all others, those placing out of all programs and those avoiding testing altogether.

[12] The main determinant of *Good standing* is whether a student has maintained a C-or-better grade point average. Other criteria, only infrequently decisive in the classification, include a minimal term credit enrollment and proper behavior. The main alternative to good standing is *probation*.

Fig. 3. Degree-Seeker Achievement and Cumulative Student Academic Attributes

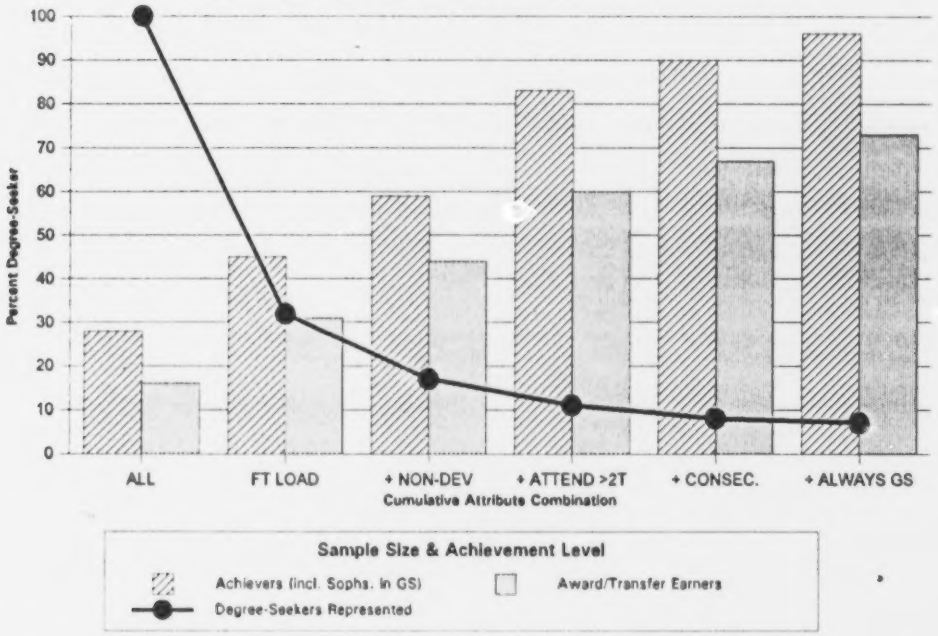

Table 5. Degree-Seeker Achievements and Cumulative Student Academic Attributes

Cumulative Criteria Sub-Samples	% Achiever	% Award/ Transfer	% Type	N Type
All Degree-Seekers	*28*	*16*	*100*	*2,387*
▸ Mean Term Study Load 12 + Hours	45	31	32	773
▸ Term 1 Non-Developmental Students	59	44	17	414
▸ 3 or More Major Terms Attended	83	60	11	249
▸ Consecutive Term Attendance Only	90	67	8	194
▸ Always in Academic Good Standing	96	73	7	169

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But as a tentative step in the total system, we can at least try to pin down the way the few variables already considered in this report combined to affect student outcomes. Reviewing each variable combination and its achievement rate should give us a sense of how a particular set of cohort students who managed to reach a particular point in the PGCC academic process ultimately fared. As we already know, presently fewer than one entering freshman in three actually manages to maneuver through our system all the way to a degree, transfer or sophomore in good standing status. The questions we will be trying in a very preliminary way to answer here are -- Does the relatively low student achievement rate at PGCC trace mainly to some sort of system failure? Or might it be the natural outcome of a properly functioning educational system, given the kinds of students who tend to enroll and the sort of attendance decisions they typically make?

Table 5, above, provides achievement rates for cohort sub-samples defined by combinations of various achievement-facilitating attendance and attribute categories. Sub-samples were created according to a systematic, hierarchical scheme. Beginning with the total sample (all cohort degree-seekers), the scheme called for producing a series of more and more narrowly defined sub-samples by adding a new criterion at each step. Thus, the first table row represents the total sample, the second row full-time students only, the next full-timers not placed into developmental programs, the next non-developmental full-timers who attended at least three major terms, and so on. The table's first two columns give the achievement results -- percent all achievers and percent earning an award or transfer within four years of study; the last two columns show the total sample percentage and raw headcount accounted for by each sub-sample. Companion Figure 3 on the same page conveys the identical information graphically.

The results are dramatic. We begin with the simple whole degree-seeking sample which collectively generated a *28 percent achiever rate* (award/transfer 16 percent), proceed to the single criterion full-time sub-sample where we find a 17 percent increase in the achievement rate (as well as a doubling of the award/transfer proportion), and ever upwards in achievement levels with each subsequent sub-sample until we reach the final 5-criteria sub-sample which exhibited an astonishing *96 percent achiever rate* (along with an award/transfer earner proportion of almost three-quarters -- 73 percent)! Cohort degree-seekers who chose to study on a full-time basis, had the basic college-level skills upon entrance to avoid remedial course-taking, persisted in attendance through at least three major terms, decided never to skip a semester's study, and performed at a passing grade point average level each term succeeded academically almost without exception.

Not surprised? After all, the sub-sample just characterized matches the usual description of the classic college undergraduate -- ready to learn, full-time student, straight through attender, C or better course performer, degree-bound -- whom everyone expects to sail smoothly on to scheduled program completion, barring chance misfortune. It's almost a mechanical proposition: register enough terms to enroll in enough courses to pass enough courses to graduate or transfer -- follow this formula as a student at any competent higher educational institution (including PGCC, according to Table 5) and success is guaranteed.

That, of course, *is* the surprise. If our cohort analysis is any guide, PGCC *does* function so that those students who come prepared, make the right attendance decisions (circumstances permitting), study long and hard, and demonstrate at least minimum adequate scholarship almost always reach their educational objectives -- *despite* initial impressions to the contrary: overall, fewer than a third of our first time entering students end up with degrees, transfers or sophomore status after four years.

The problem is numbers -- so few of our students match, or even begin to approach, the classic undergraduate description. The Percent of Type column of Table 3 and the Degree-Seekers Represented data line in Figure 3 tell the tale: the more narrowly defined a subsample, the closer it resembles the hypothetical classic undergraduate sample and the better its achievement rate -- but also, the smaller the proportion of all cohort degree-seekers it represents. When the total sample is cut to just its full-time membership, only 32 percent remain. When this sub-sample is made to exclude developmental members, only 17 percent remain. By the time we reach our 5-criteria classic undergraduate surrogate, the proportion of the original sample dwindles to a mere 7 percent. The college-wide academic achievement level is as low as it is because the great majority of PGCC students, who tend to fall into most or all of the attendance and attribute categories that militate against successful study outcomes, more than cancel out the high performance impact of the minority.

From the standpoint of college planning, this finding might seem to argue for inaction, on the realistic grounds that higher educational institutions have little or no control over the sort of demographic, economic and psychological forces which determine attendance patterns, remediation needs and the like. This would be especially true of community colleges which normally may not alter the character of their student bodies by changing admissions practices. If the immutable fates have dealt a community college an under-achieving enrollment hand from the great deck of potential students, than it has no choice but to play it as best it can. However, even if one accepts this overstated argument, often there is much which can be done with a poor or mediocre hand. If one can't effect *output* by influencing *input*, one

might try maximizing *through-put*. The trick is to identify through research of this kind just those strategic points of greatest impact on study progress within the academic process, over which the institution does exercise significant control, and locate intervention programs there.

We would like to illustrate this point by expanding upon our earlier discussion of cohort enrollment retention which mentioned almost two-fifths of Cohort 1990's degree-seekers (38 percent) failed to persist beyond their second term. As a consequence almost all of these (96 percent) exited PGCC as "non-achievers" (4 percent managed an early transfer). But of those students whose attendance did extend beyond the first year, 43 percent were classifiable as achievers by the time they left the college. To this can be added our discovery of the "Good Start" effect -- that the odds of academic success for students registered in all three initial terms were better than even (55 percent achievers).

If these cohort findings can be generalized, the lesson for PGCC students might be that their chances of academic success *shoot from virtual zero up to 2-in-5 if they strive to persist beyond the first year and are better than even if they hang in for all three early semesters*; the parallel lesson for the college might be that its relatively overall low student achievement rate (28 percent) traces substantially to the *high early term attrition rate; were all students retained through Term 3, PGCC academic outcomes would be improved by a factor near two*.

The point is that were it not for the devastating "shakedown" effects of the Launch Period, a strategic point in the total academic process if there ever was one, things might be vastly improved for both parties. Our cohort analysis suggests that an intervention program for "at-risk" students placed here, like the recently considered Freshman Academy, would stand a good chance of leveraging a maximum pay-off in student academic progress for the college's investment.

The Timing of Academic Outcomes

An entering student cohort data set, with its term-by-term data element structure, is the ideal analytic tool for answering questions concerning the timing of events. In this final section we will briefly review the final academic outcome flow across the cohort's four years of existence, and present our findings on the average length of study required of Cohort 1990 degree-seekers to earn sophomore status, an associate degree, and transference to four-year Maryland public colleges and universities.

Figure 4. Final Outcome Flows

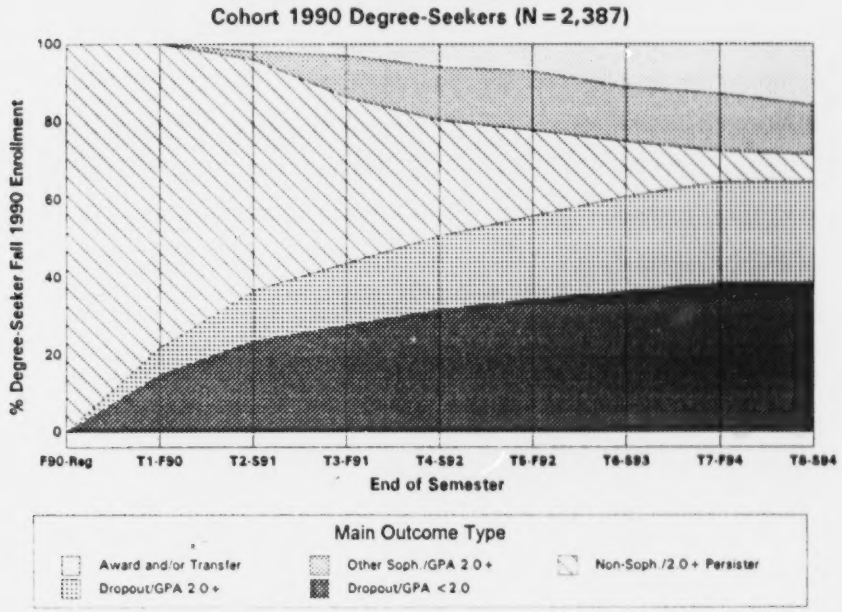

Table 6. Cohort 1990 Degree-Seeker Term-by-Term Outcome Flows

Outcome Type	T0 Regis.	End of Major Term: T1 Fall 90	T2 Spring 91	T3 Fall 91	T4 Spring 92	T5 Fall 92	T6 Spring 93	T7 Fall 93	T8 Spring 94
Achievers	*0*	*<.5*	*4*	*13*	*20*	*23*	*26*	*27*	*28*
Award/Transfer	0	<.5	2	3	6	7	11	13	16
Award	0	0	0	0	1	1	4	4	6
Transfer	0	<.5	2	2	6	7	10	11	12
Other Soph./GS	0	0	2	11	14	15	14	15	13
*Persisters**	*100*	*78*	*60*	*43*	*30*	*22*	*14*	*8*	*7*
Other Exiters	*0*	*22*	*37*	*44*	*51*	*55*	*60*	*65*	*65*
with GPA 2.0+	0	7	13	16	19	21	24	26	26
with GPA <2.0	0	15	24	28	32	34	36	39	39

NOTE: Summer term outcomes backdated to previous spring semester; the separate Award and Transfer categories overlap and their percentages do not sum to equal that of Award/Transfer; taking into account rounding error, Award/Transfer + Other Sophomores in Good Standing = Achievers, * Persisters are Term 8 continuing students not Sophomores in Good Standing.

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Cohort Outcome Flow. A cohort outcome flow is a data series representing the entire life of the cohort which shows how students accumulate in an outcome category over time as they exit their studies. Cohort flow analysis is similar to mortality analysis in actuarial studies, except that it allows for multiple termination types, positive as well as negative. Outcome flows for Cohort 1990 degree-seekers are presented numerically in Table 6 and graphically in Figure 4, above.

Most Table 6 rows represent outcome categories and sub-categories. Columns give the accumulated percentage of all cohort degree-seekers includable for each final outcome type (award/transfer achievers and other exiters) by each major semester's end. With one exception,[13] these outcome percentages always *grow* across the series, a consequence of time's inevitable conversion of *continuing* students into *finished* students. With each semester's conclusion, some number of cohort students would have either completed or abandoned their studies, shifting out of one or the other of the two continuing attendance groups -- persisters (continuing students either not yet sophomores or not in good academic standing) and continuing sophomores in good standing -- and into their terminal groups.[14]

In reviewing Table 6's findings, let's begin with the *totally unfinished* students -- the *persisters*, those still attending without accomplishing even sophomore in good standing status. Logically enough, at the entering term registration point, 100 percent of cohort degree-seekers fell into this category. But with time, this percentage swiftly shrank, and by end of Term 3, a majority had experienced academic success by our measure, leaving only 43 yet to achieve. Thereafter, the percentage slowly but

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[13] The exception is the achiever sub-category *Other Sophomores in Good Standing* (neither award nor transfer earners). This is the only outcome category or sub-category the percentages of which can fluctuate downward as well as upward. This is because the continuers in good standing group is one of its two components (the other being exiters in good standing). Continuing students in good standing were added to this group at the end of the first semester they achieved sophomore status, even though, strictly speaking, this was *not* a *final* outcome. The end-of-semester moment, however, that such students exited, they were re-allocated to the appropriate true final outcome category -- award/transfer earner or other exiting sophomore in good standing.

[14] Once again with the exception of those classified as continuing sophomores in good standing, it should also be noted that students are shifted from a continuing group to an outcome group at the term of exit, not the term of achievement. For the vast majority of students these are equivalent dates, but for a significant minority achieving may occur earlier for various reasons or even after exiting for various reasons. Examples of circumstances leading to pre-exiting achievement are the multiple achievement case (e.g., earning a certificate and then several terms graduating upon earning an associate degree) and the temporary concurrent attendance case (simultaneous PGCC and the transfer school enrollment); post-exiting achievement is illustrated by most transfers, which typically take place the semester *following* the last semester at PGCC. In outcomes flow analysis, setting outcome occupance to last term efficiently eliminates complications resulting from these minor dating disparities.

steadily dwindled until it reached a mere 7 percent by the conclusion of Term 8, the last observable semester. Put another way, after four years of the cohort's existence, the academic fate of virtually all its degree-seeking members (93 percent) could be specified -- at least as far as achievement in terms of earning an award, transfer or sophomore in good standing status is concerned . It should be mentioned, however, that another 5 percent can be added to the persister 7 percent to arrive at the proportion of *all continuing degree-seekers* after four years. This 12 percent would include Term 8 continuing sophomores in good standing (not separately tracked in the table), who along with non-award/transfer earning sophomores in good standing already exited make up an achievement group under our outcome paradigm. Research on earlier cohorts suggests that it takes around six years for a cohort effectively to "die off"; by its final twelfth term, Cohort 1984 was reduced to a handful of still continuing students (4 percent) and a similar destiny is likely for Cohort 1990.

Of greater interest, certainly, are the positive and negative outcome flows that result from the academic processing of continuing students. According to Table 6, well over half (37 percent) of all non-achieving exiters (65 percent) reach their destination quite soon -- by the end of the second term -- and more than two-thirds (44 percent) are in place by Term 3's conclusion. This brings to mind the radical drop in retention during the initial cohort terms we documented earlier, and re-enforces our sense of the criticality of the Launch Period for dealing with "at-risk" students.

In contrast, the accumulation of positive outcomes occurs more slowly. According to Table 6, it took at least three terms of Cohort study to produce not quite half (13 percent) of the ultimate proportion of student achievers (28 percent) and another term to reach the two-thirds level (20 percent). Furthermore, most of the early growth of the achiever category was accountable by the weaker form of achievement -- sophomore in good standing status. Students exiting with awards or transfers under their belts did not form half their eventual proportion of the whole (16 percent) even by Term 5.

Study Time to Specific Academic Achievements. Examining cohort outcome flows is useful for grasping the global, interlocking pattern of outcome timing. The sorts of questions an analyst will seek to answer given data tend to be theoretical, probes destined to develop an explanation of the total academic process -- for example: "During what segment of a cohort's existence does Outcome A seriously begin to manifest itself?," "Why does an outcome manifest mainly during Period X and what policy implications follow?," and "If Outcome A's flow could be slowed in Period X, how might this effect Outcome B's flow and final state?"

But for answering simple, practical questions such as "How long does it take a typical PGCC student to earn an associates degree?," and "Do full-time degree earners tend to graduate sooner than part-time degree earners?," the analyst is better off working with one or more straight-forward attendance duration indicators like *number of terms actually attended by degree earners.* This leads to clean, uncomplicated responses like "so many mean terms," makes comparing results for different types of students (developmental or non-developmental, full-time or part-time, and so on) easy, and allows the analyst to employ a number of different indicators, each expressing a different aspect of "duration" and yielding different research insights.

For example, an analyst might be interested in finding out how long on average students in each achievement group studied at a college or university (*total attendance duration)*; the traditional approach here is to calculate the group mean number of major terms from the entering semester through the final semester of attendance. This is the statistic normally supplied in answer to the question "How long does it take?" By definition, the total attendance duration measure includes skipped terms, as well as all terms between the achievement completion term and final attendance term in those cases where the specific achievement in question is non-terminal (e.g., sophomore status).

A more direct way of measuring "how long" would be to examine *actual attendance time* to an outcome, in which case the analyst might employ an indicator like mean number of terms actually attended up to outcome classification. This approach efficiently eliminates the "attendance inflation" inherent in the first indicator by automatically discounting stop-out behavior and post-achievement attendance.

Both indicators have their points: the first emphasizes the whole span of study, in all of its complexity, associated with each type of achievement, while the second zeroes in on essential or necessary study time to accomplish an academic goal. For all degree-seekers in Cohort 1990, using these two measures yields the following results: on average, the whole study span of cohort degree-seekers covered 4.1 major semesters, but actual term attendance time amounted only to 3.4 semesters.[15]

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[15] Although somewhat artificial, a measure even more direct than number of attended terms is mean number of full-time- equivalent terms, calculated by dividing final cumulative course hours by 12. For all Cohort 1990 degree-seekers, the mean number of FTE terms proved to be 2.8.

Table 7. Timing of Cohort 1990 Degree-Seeker Achievement by Study Load and Developmental Sub-Samples

Timing Indicator by Achievement Groups	Academic Process Type						
		Mean Study Load			Developmental Placement T1		
	All Deg.-Seekrs	Full-time	Part-time	Full - Part	Non-Dev.	Dev.	Non Dev - Dev.
MEAN # TERMS IN TOTAL ATTENDANCE SPAN:							
Sophomore Status Achievers	6.1	5.4	6.9	-1.5	5.9	6.6	-0.7
AA Graduates	6.4	5.9	7.2	-1.3	6.3	6.6	-0.3
Transfer Earners**	4.9	4.6	5.6	-1.0	4.9	5.0	-0.1
MEAN # TERMS ACTUALLY ATT'D UP TO ACHIEVEMENT:							
Sophomore Status Achievers	3.9	3.3	4.5	-1.2	3.6	4.4	-0.8
AA Graduates	5.9	5.4	6.8	-1.4	5.8	6.3	-0.5
Transfer Earners**	4.1	4.0	4.4	-0.4	4.0	4.4	-0.4

* Sample Sizes: Sophomores -- All (643), FT (328), PT (315), Non-Dev. (418), Dev. (225); AA Graduates -- All (130), FT (83), PT (47), Non-Dev. (97), Dev. (33); Transfers -- All (284), FT (202), PT (82), Non-Dev. (216), Dev. (68).

** Adjusted data used for Transfer calculations

Table 7, above, shows achievement timings by the two indicators for three achievement groups -- sophomore status achievers,[16] AA graduates and transfer earners.[17] Timing statistics are also shown for achievement group sub-samples based on two academic process variables which past research shows capable of affecting rate of students progress -- study load and Term 1 developmental placement. In general, full-time students progress more rapidly than part-timers for the simple and obvious reason that they take more courses per term; and developmental students tend to fall behind non-developmental students because of the extra burden of

[16] Good standing is not a permanent achievement but is designated on a term-by-term basis, and since our intention here is timing permanent accomplishments, in this case, academic good standing is not stipulated.

[17] All term means found in Table 7 are provisional timing estimates based on four year cohort analysis. The final six year analysis at the effective end of the cohort's lifespan will doubtless show a small number of persisters becoming achievers of one sort or another, thus marginally increasing these timing estimates.

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remedial courses required of them and lack of pre-requisites to begin credit course work. The shaded columns in Table 7 -- simple mean timing differences between full-time/part-time and non-developmental/developmental sub-samples -- represent the cost in mean extra terms to students falling into the slower sub-samples.

Cohort degree-seekers earning sophomore status had PGCC study careers averaging 6.1 major terms and within that span actually worked 3.9 terms to accumulate 30+ credit hours. Naturally, AA graduates, who had to go on beyond mere sophomore status to complete course-taking in their degree field, took longer: on average, their study careers lasted 6.4 major terms, which encompassed 5.9 terms worth of actual attendance. In contrast, cohort degree-seekers managing transfer to four-year Maryland public post-secondary institutions accomplished that task much sooner: study duration among them averaged just 4.9 major terms, 3.9 terms actually attended.[18] This finding comports well with past research showing the ever growing tendency of successful students to by-pass associate degree earning entirely, heading directly for transfer schools as soon as the minimum number of transferable credit hours are accumulated.[19]

Of the two process variables tested, study load proved to have the stronger impact on achievement timing. According to Table 7, to reach sophomore status, students who elected to attend PGCC on a part-time rather than on a full-time basis added on average 1.5 major terms to their study careers (1.2 more terms in actual attendance). Mean part-time AA graduate study span exceeded full-time span by 1.3 major terms, and for this group obtaining a degree took 1.4 terms more of actual attendance compared with their full-time peers. Full-time transferring students also had the timing advantage over part-timers -- by 1 term in study duration and by a third of a term in actual attendance. Developmental placement seemed to matter considerably less: in all three achievement cases, the sub-sample of students unhindered by remedial work was somewhat speedier than the parallel developmental sub-sample, but differences approached a whole term only for progress toward sophomore status; differences in the timing of graduation or transfer never exceeded a half term. Resistant to influence by both process variables was transfer timing.

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[18] A finding all the more notable, considering that the transfer sub-sample used here included cohort members transferring *with AA degrees*. The parallel figures for *transfer only* students are 4.7 (study duration) and 3.8 (terms attended).

[19] A secondary reason for fast achievement rates among transfer students relates to an interesting side finding: at one point in our research we directly cross-tabulated date of transfer term with term of final attendance and discovered to our surprise that exactly a quarter of all students transferring did so prior to leaving PGCC. These were, in effect, concurrent students -- studying a both PGCC and a four-year school simultaneously.

Fig 4. Academic Process Variables and and Terms to Achievement

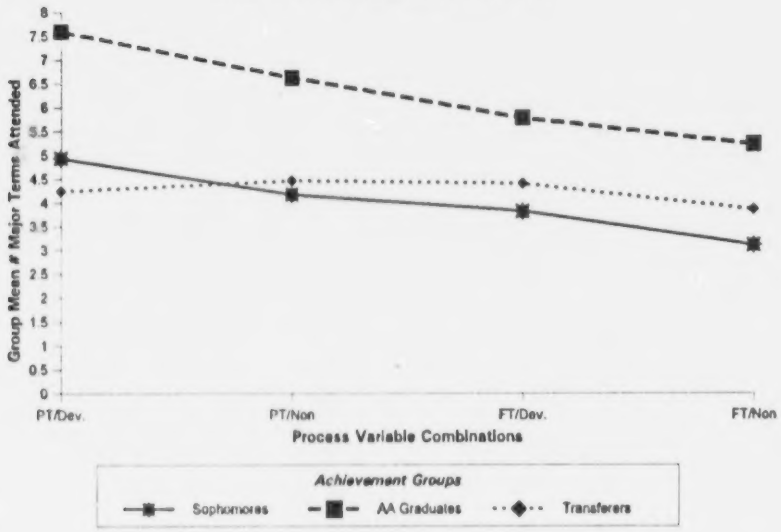

Table 8. Timing of Cohort 1990 Degree-Seeker Achievement by Additive Study Load /Developmental Sub-Samples

# Terms Attended through Achievement Term	Additive Academic Process Combination			
	Part-time/ Dev.	Part-time/ Non	Full-time/ Dev.	Full-time/ Non
Sophomore Status Achievers	4.9	4.2	3.8	3.1
AA Graduates	7.6	6.6	5.8	5.2
Transfer Earners**	4.3	4.5	4.4	3.9

* Sample Sizes: Sophomores -- PT/Dev (125), PT/Non (190), FT/Dev (100), FT/Non (228); AA Graduates -- PT/Dev (10), PT/Non (37), FT/Dev (23), FT/Non (60); Transfers -- PT/Dev (20), PT/Non (62), FT/Dev (48), FT/Non (154).

** Adjusted data used for Transfer calculations

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Table 8 and companion Figure 4 above, focusing on number of terms attended to an accomplishment, points to how study load and developmental placement can often work in tandem to affect achievement timing. The columns of Table 8 (and x-axis points of Figure 4) represent the four joint categories of the cross of dichotomous process variables study load and developmental placement, ordered from the least facilitating (part-time/remediation required) to the most facilitating (full-time/non-developmental) in terms of study progress. Clearly, the joint effect was regular and dramatic when it came to speed of obtaining sophomore status and an AA degree for Cohort 1990. Part-time developmental members achieving sophomore status took an average of 4.9 attendance terms to accumulate 30 credit hours, compared with full-time sophomores not in developmental programs who only had to attend a mean of 3.1 terms to gather the same number of credits -- a difference of nearly two whole semesters (1.8). The two middle categories of degree-seekers exhibited mean attendance terms to sophomore status between these extremes. Similarly, among cohort AA graduates, part-time developmental students needed to work a full 7.6 terms on average to earn their degrees, while full-time, non-developmental students required almost 2.4 fewer terms attended (5.2). And again, part-time, non-developmental and full-time, developmental graduates registered middling mean attended terms to graduation -- 6.6 and 5.8, respectively. The additive impact of study load and developmental placement on transfer timing, however, proved trivial -- only ranging from 3.9 to 4.5 terms attended among the for sub-samples.

The findings of Table 8/Figure 4 raise for us two important questions. First, why did PGCC student academic process characteristics work so well to explain speed of sophomore status and AA attainment, but so poorly to explain the timing of transfers to four-year colleges and universities? The answer we suggest lies mostly in the different ways the three types of achievement articulate with the PGCC academic process. At the bottom of both sophomore status and degree achievement is simple PGCC credit hour accumulation, which is an intrinsic, exclusive component of the overall PGCC academic process. But by its very nature, the transfer process is only partly contained within the PGCC academic process. The processes of the receiving educational institution play an equal role here. This greatly multiplies student options and gives would-be transferrers considerable leeway in determining when the jump between schools should occur. For example, the number of credits needed to transfer is usually minimal. Meeting requirements tends to be a relatively easy matter even for PGCC part-timers, unlike accumulating the 30 PGCC credits hours for sophomore status or many additional PGCC credit hours, from courses offered and under the rules set by a particular PGCC instructional department, for a PGCC associate degree.

The second question raised by the data has to do with how one should assess the PGCC achievement timings discovered; If the findings of the cohort analysis can be generalized, are PGCC students taking too long to become sophomores and to graduate with associate degrees? Or are PGCC student achievement timings defensible by some demographic or academic process standard?

Let's begin our assessment with the basic finding that the mean span of attendance we found for Cohort 1990 members achieving sophomore status equalled 6.1 major terms. This seems way out of line, considering that as a matter of simple course-taking mechanics it would be possible, at the rate of 15 credit hours per semester, to amass 30 credit hours during the first two semesters, or by the end of the third term, setting full-time study to 12 credit hours per semester. Such an extreme over-shooting of the baseline, it turns out, was mostly a result of using the traditional study span indicator of achievement timing, which counted stopped-out semesters and all terms post-dating sophomore status. When we employed instead the more realistic indicator -- number of terms attended through sophomore achievement term -- we found that cohort degree-seekers actually took only 3.9 semesters to reach credit hour accumulations of 30+. Furthermore, when we restricted our attention to cohort members most resembling the classic college undergraduate -- full-time students not requiring remediation in basic college skills -- we found this sub-sample arriving at sophomore status nearly on baseline schedule -- 3.1 terms. Thus, stop-out behavior, part-time attendance and developmental course-taking accounted for nearly all delay in the quest for sophomore status.

This also appears true for degree achievement. Here, the basic finding was that cohort AA earners had a mean span of attendance equalling 6.4 major terms. This does not over-shoot by much the baseline minimum possible number of major semesters needed to graduate: around 4.0 (60 total credit hours at 15 per term) or 5.0 (12 credit hours per term).[20] Furthermore, controlling for attendance complication by moving to the terms actually attended indicator and restricting consideration to full-time non-developmental students brought the estimate of time to graduation down to within .2 terms of the 5-term standard. While it remains true, at PGCC and most other community colleges, that the day of the literal two-year degree is long gone, the cause of its demise, at least at PGCC, is no longer a mystery -- increasing term-skipping, part-time attendance and lack of college preparedness.

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[20] The total number of credit hours needed to graduate from PGCC with an associate degree is 60 at a minimum; however certain programs, particularly those in the Allied Health, require more.

Summary and Conclusions

This report is the second in a three-part series which reviews the findings of a comprehensive analysis of the academic behaviors and outcomes of the 1990 first time entering student cohort. Its particular focus is term-by-term student academic progress.

First examined were patterns of attendance phenomena:

- Retention across terms is best measured by calculating the continuing number of students at each semester point (actual attenders + current absentees who attended subsequent terms) rather than by the traditional attenders only approach. We found that the traditional method consistently under-estimated the proportion of "students-in-process" by around 10 percent for most terms.

- The initial 2-3 major terms proved to be the critical attendance interval during which students were maximally "at-risk" at PGCC. The college lost more than two out of five Cohort 1990 degree-seekers by the end of the first spring semester and well over half by the conclusion of the second fall, suggesting that intervention efforts ought to be concentrated during this "Launch Period" for optimum retention effect.

- Two other important aspects of attendance are continuity (sequential vs. interrupted term attendance) and concentration (study load). Of the 56 percent of Cohort 1990 degree-seekers attending enough semesters to make continuity analysis possible (more than two major terms), 34 percent enrolled consecutively, 15 percent "stopped out" only occasionally, while 7 percent experienced major enrollment interruptions. A large majority (68 percent) of cohort members averaged less than 12 course hours per semesters attended; of the "full-time" cohort members, 28 percent enrolled a term mean of 12-14 hours while only 4 percent averaged 15 or more hours.

Patterns of attendance and related *academic process* phenomena, while interesting in themselves, are in the end mainly a matter of concern for the ways they impact on final academic outcomes. For example, we seek to understand and enhance enrollment retention mostly because students who don't continue in their studies don't earn degrees and transfers. In analyzing Cohort 1990 data, we attempted direct correlations of the more important academic process variables with four-year academic achievement, with the following results:

- Around 28 percent of all cohort degree-seekers classified as achievers (associate degree, certificate or letter-of-recognition earners, successful transferrers to four-year schools, or students obtaining sophomore in good standing status) after eight major terms of possible study.

- Attendance *persistence* (retention re-conceptualized as student enrollment effort -- number of terms actually attended) proved to be the strongest predictor of academic achievement among the process variables tested: students persisting through at least four terms were nearly 10 times more likely to become achievers (57 percent) than those attending fewer than four semesters (6 percent). This finding illustrates the truism already mentioned: Students who don't take courses, don't succeed academically.

- The second most powerful process variable turned out to be course performance as measured by academic standing. Being designated as a student in *good* academic standing at PGCC is basically a matter of maintaining a course passing 2.0+ grade point average. Not unexpectedly, we found that consistent course-passing, along with course-taking, leads to success: Students always in good standing were almost five times more likely (58 percent) to classify as achievers by their final semester than those who fell out of good standing at any point in their PGCC attendance (12 percent).

- The three other process variables tested also had significant impacts on chances of academic achievement. In each case, students who attended sequentially, carried full-time study loads on average, and did not place into a remedial program were about twice as likely to earn awards, transfers and sophomore in good standing status than their respective opposites -- most part-time students, stop-out students and developmental students.

- These five process variables worked best as a package. For example, students representing all achievement-facilitating academic process categories (high persistence, always in good standing, sequentially attending, carrying full-time study loads, and not requiring skills remediation) almost always ended up as achievers -- 96 percent!

- The great power of the total academic process, even when crudely represented as above, to predict academic success or failure, highlights the importance of the systematic modelling of academic *through*put in

explaining academic *out*put. It also helps us to understand why PGCC's aggregate student achievement rate is relatively low -- only a very small proportion (about 7 percent) of the typical PGCC student body resembles the classic undergraduate type -- college-ready, full-time, straight through -- who almost always manages to graduate or transfer.

The last portion of the report was devoted to timing considerations -- how long did cohort members attend PGCC, and how many semesters proved necessary to earned sophomore status and earn degrees and transfers?:

- On average, cohort degree-seeker attendance spanned 4.1 major semesters (first term through final term of enrollment, counting stop-out terms) out of a total 8 possible semesters; in terms of major semesters actually attended, the typical cohort member spent 3.4 terms at PGCC.

- It took cohort sophomores a mean of 3.9 major terms attended to accumulate 30 credit hours; the mean total attendance span for sophomores, most of whom continued on beyond 30 hours in search of degrees and transfers, was 6.1 terms.

- AA graduates in the cohort had enrolled in 5.9 major terms on average to earn their degrees (which came close to their mean attendance span of 6.4 terms). In contrast, the hypothetical typical transfer was accomplished within only 4.1 major terms (4.9 total attendance span). The much speedier accomplishment of transfer at PGCC is linked to the growing *pass-through* trend -- attendance for transfer purposes only.

- Full-time sophomores and non-developmental sophomores took approximately one less term to collect 30 credit hours than part-time and developmental sophomores. Much the same was also true for AA graduates. When we combined study load and developmental placement variables, we discovered that full-time, non-developmental sophomores took only 3.1 terms actually attended to achieve that status, while full-time, non-developmental AA graduates needed only 5.2 terms to earn their degrees. These timings come close to the mechanical minimums of 2.5 12-hour terms to 30 cumulative credit hours and 5.0 terms to AA graduation.

- Time to transfer, however, seemed almost unaffected by study load and developmental placement. These two critical process variables did not significantly correlate with the timing of transfer achievement, either singularly or in combination, largely because the moment of leaving PGCC for a four-year school is a personal decision.

In conclusion, our process variable analysis of the Cohort 1990 dataset found strong support for the view that academic achievement occurs as part of a complex process which needs to be modelled in some detail in explaining outcomes. Even when modelled crudely, as in this analysis, we were able to account for a very high proportion of the variation in student performance. In the third and final report in this series, we will provide a systematic, multivariate analysis of PGCC academic outcomes combining background and process factors in a structured causal matrix.

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